

Energy Consumption Measurements and Optimization in Mobile Networks

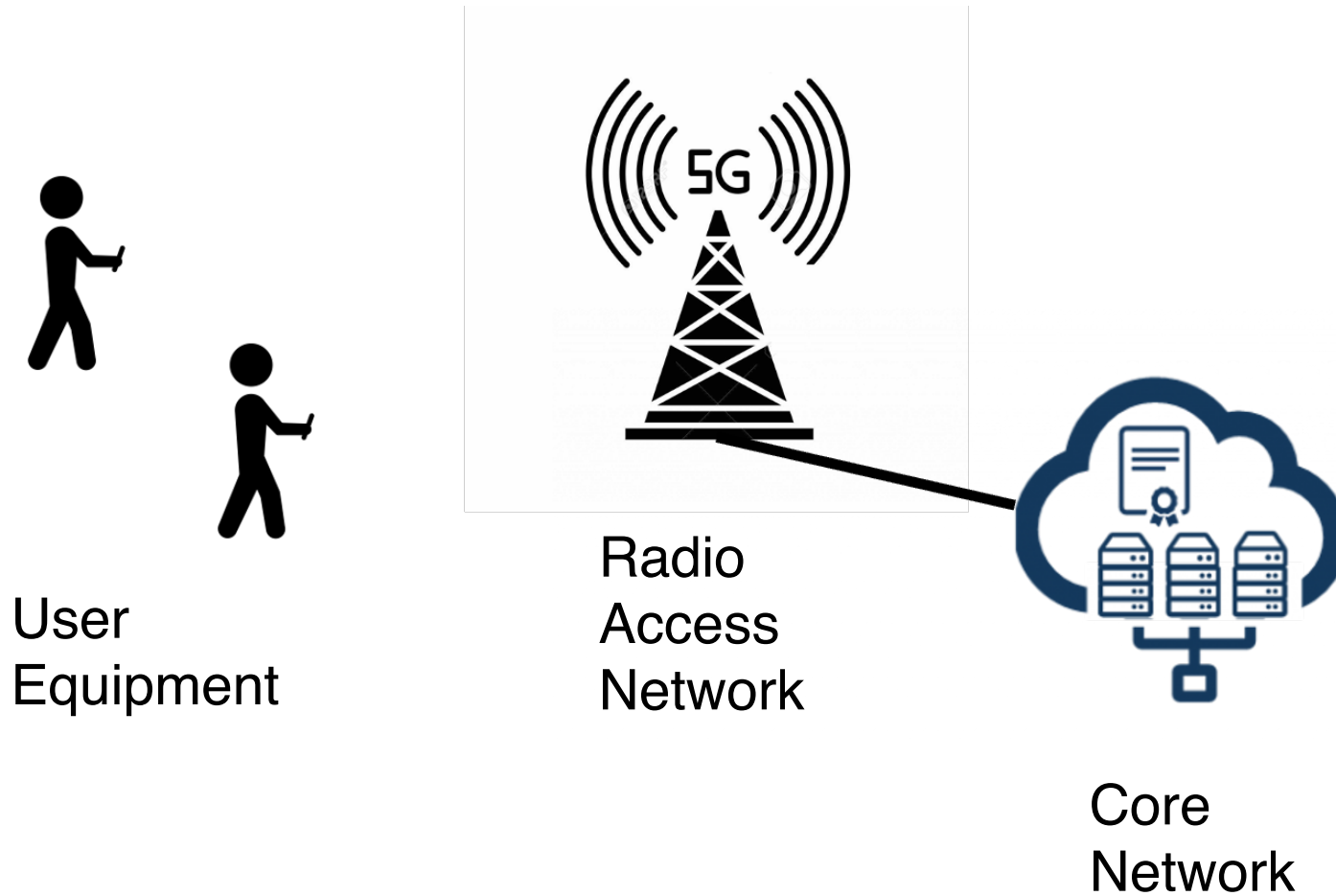
S-ICT 2020

Razvan Stanica
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Telco energy consumption

- ▮ Became a public debate subject with the pandemics and the 5G deployment.
- ▮ Political decisions such as limiting the video streaming quality or 5G moratoriums.
- ▮ Differences of up to 100x between different models (ShiftProject vs. IEA)

Mobile network architecture



Some numbers

- ▮ The telco industry accounts for 2-3% of global energy
- ▮ Energy costs represent 20-40% of operational costs for a telco operator
- ▮ Base station power amplifier accounts for 60% of the RAN energy
- ▮ Air conditioning at the base station accounts for 20% of the RAN energy (and more than 50% of the technical problems)

State of the art

- ▮ User Equipment

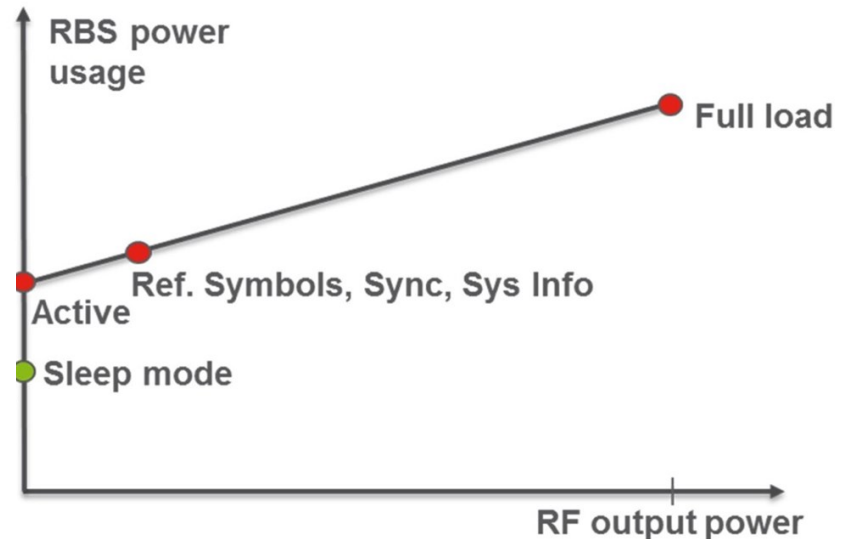
- ▮ Manufacturer data sheet
 - ▮ A few independent measurement studies, focused on the apps

- ▮ Core Network

- ▮ Global (per network) or local (per data center) view on the operator side

- ▮ Radio Access Network

- ▮ Manufacturer data sheet



ECOMOME Objectives

- ‡ Conduct the first independent study on mobile network energy consumption - focus on RAN and UE
- ‡ Propose clear and accurate energy consumption models, easy to understand by decision makers and the general public
- ‡ Design energy-aware network management solutions for future technological generations

ECOMOME Challenges

- ▮ Measurement campaign
 - ▮ Take profit from recent open source platforms
- ▮ Modeling approach for a variety of scenarios
 - ▮ Decompose the operation of the mobile network in atomic functions
- ▮ Inform the public
 - ▮ Carefully designed web interface
- ▮ Reduce energy consumption
 - ▮ Target the most energy-hungry functions

Project Partners

- | INSA Lyon, France
 - | Razvan Stanica - Telco expertise, RAN metrology
- | ETS Montreal, Canada
 - | Diala Naboulsi - Network modelling and optimisation, CN expertise
- | IMDEA Networks, Madrid, Spain
 - | Marco Fiore - Network data analytics, network management
- | University Politehnica of Timișoara, Romania
 - | Marius Marcu - User equipment energy consumption expertise

First results

- Intern student at INSA Lyon - Synchronise the logs from the smartphone and those from the srsRAN platform



Other Aspects

- ▮ A project with clear sustainability-related goals
- ▮ First contacts with possible industrial partners: Snef Telecom (FR), Bouygues Telecom (FR), NetAI (UK)
- ▮ Information tool for the general public and policy makers

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